

Remarks/Arguments

With reference to the Office Action mailed June 7, 2004, Applicants offer the following remarks and argument.

Status of the Claims

Claims 1-15 were originally presented for examination. Claims 1-2 and 4-15 were allowed. Claim 3 was rejected. Applicants have amended claim 3 to distinguish over the one cited reference.

The Office Action of June 7, 2004

In the Office Action of June 7, 2004 Claim 3 was rejected under 35 USC §102(e) as being anticipated by United States Patent 6,526,401 to Ito for Device For Processing Strings.

It was stated in the Office Action that Ito FIGURE 1 illustrates a target search array (the character string “banana”). The Office Action then states that as described at column 3, lines 49-57¹ the last element in the array is located and identified by placing a “\$” character after it, indicating the end of the string. Next, the Office Action states that the strings of numbers associated with the character string, such as “0123456” and “531042” (citing FIGURES 1A and 1B) are considered intermediate patterns.

It is stated that each of the patterns has a plurality of elements (illustrated by a plurality of numbers), and that numbers are thus generated to create strings of numbers, from the last element (last number) to the first number (first element). It is stated that the locations of numbers in the intermediate patterns correlate to the locations of characters in the target search array.

¹ Further, in order to fix the lexicographical order between the suffixes, an imaginary character (for example, \$) not included in the alphabet is added to the end of the text. As a character value of "\$", the minimum value 0 is assumed. Further, as data structures for expressing the text and series of pointers, respectively, arrays are used. FIG. 1A shows the array of a text "BANANA" and the suffix array thereof. (Col. 3, lines 49-57)

It was noted that claims 1-2 and 4-15 are allowed.

The Art of Record

The sole reference is United States Patent 6,526,401 to Ito for Device For Processing Strings.

Ito is directed to processing strings, and more particularly for predicting the probability of occurrence of a character following a given string. This determination of probability of occurrence is carried out in a string processing system with:

- >a corpus-DB portion in which a corpus is stored;
- >an index portion in which a series of position numbers built for the corpus is stored;
- >a searching portion which searches for positions of occurrences of a given string in the corpus using the series of position numbers; and
- >a predicting portion which, using the result of search performed by the searching portion, predicts a probability of occurrence of a character following the given string.

Applicant's Claimed Invention

Applicants have amended claim 3 to positively point out and recite their invention. Specifically, claim 3 now recites a text database searching method including a pattern search method and a character string extraction method. The claimed pattern search method comprises finding a desired pattern in a search target array by the steps of:

- > finding the location, in said array, of the last element of the desired pattern; and
- > obtaining intermediate patterns within the search target array, when the pattern consists of a plurality of elements, by adding elements one by one,

beginning with an element located immediately before said last element, and determining the locations of said intermediate patterns in said array.

Applicants' claim 3 now recites the pattern string search and extraction method by the subsequent step of extracting a character string designating elements of the character string that correspond to elements included in the range of the array, and extracting character string segments consisting of the same number of elements as the elements of the pattern and having the elements of the character string as their first character.

The amendment is fully supported by numbered paragraph [0022]² which describes the range search step and the character string extraction step.

Discussion

The overarching issue presented is whether Ito's description of what is described in the context of a data compression tool anticipates Applicant's amended claim 3 of a text search tool.

Applicants' claim 3 now positively recites the text searching and extraction steps (as described in numbered paragraph [0022]), i.e., finding a desired pattern in a search target array and the subsequent step of extracting the character string. Specifically, one of the stated objects of the invention is performing a fast search of a large text database, while suppressing an increase in the data size of a data structure used for the process.³

² [0022] To achieve the above object, according to the present invention, a pattern search method for searching a target character string for a desired pattern comprises: a range search step and a character string extraction step performed as follows. At the range search step, intermediate patterns are obtained by adding characters in order, one by one, from the last character of the pattern to the first, and a range is determined for a suffix array, which corresponds to the target character string, wherein the first character of each of the intermediate patterns is present. Since this search is conducted beginning with the last character of the pattern, finally, the range of the suffix array, including the pattern itself, can be obtained. Then, at the character string extraction step, elements of the character string are designated that correspond to elements included in the range of the suffix array, and character string segments are extracted consisting of the same number of elements as the elements of the pattern and having the elements of the character string as their first characters." (Numbered paragraph [0022])

Figure 6

Figure 6 illustrates background example suffix tree of the prior art. Appropriate amendment has been made.

Applicants' attorney apologizes for the reference to numbered paragraph number of the corresponding Published Patent Application instead of the page and line numbers of the application as filed.

³

[0021] It is, therefore, one object of the present invention to perform a fast search of a large text database, while suppressing an increase in the data size of a data structure used for the process.

Conclusion

Based on the above discussion, it is respectfully submitted that the pending claims describe an invention that is properly allowable to the Applicants.

If any issues remain unresolved despite the present amendment, the Examiner is requested to telephone Applicants' Attorney at the telephone number shown below to arrange for a telephonic interview before issuing another Office Action.

Applicants would like to take this opportunity to thank the Examiner for a thorough and competent examination and for courtesies extended to Applicants' Attorney.

Respectfully Submitted

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